

CLAIM SHEET

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09/280,637



1) (Amended) -A method of detecting degradation of a rope comprising a body of non-ferromagnetic insulator material in which a plurality of longitudinally extended ferromagnetic cord members is distributed transversely, ~~said the~~ method comprising applying a magnetic field to a portion of ~~said the~~ cord members by positioning a pair of magnetic poles adjacent to the body of the rope, wherein the poles are spaced longitudinally relative to the rope;

monitoring, at a position between the poles along a longitudinal direction of the rope, magnetic flux emanating from the cord members out through the body of the rope and associated with ~~said the~~ magnetic field; and identifying, based on the magnetic flux monitored at the position between the poles, locations along ~~said the~~ cord members exhibiting magnetic flux leakage, wherein ~~said the~~ locations are indicative of degradation.

2) (Amended) AThe method according to claim 1, wherein

~~said the~~ magnetic field is applied by relative movement between ~~said the~~ rope and a magnetthe magnetic poles.

3) (Amended) AThe method according to claim 1, wherein

~~said the body of the rope comprises a body of non ferromagnetic insulator material having~~ has a generally rectangular cross-section in which ~~said the plurality of ferromagnetic cord members are distributed and extend longitudinally therewith.~~

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4) (Amended) A method of detecting and locating degradation of a rope comprising a body of non-ferromagnetic insulator material in which a plurality of longitudinally extended ferromagnetic cord members is distributed transversely, ~~said~~ the method comprising

causing ~~said~~ the rope to move at a known rate relative to a magnet pair of magnetic poles positioned adjacent to the body of the rope and spaced longitudinally relative to the rope in order to apply a magnetic field to a portion of ~~said~~ the cord members;

monitoring, at a position between the poles along a longitudinal direction of the rope, magnetic flux emanating from the cord members out through the body of the rope and associated with ~~said~~ the magnetic field as a function of time; and

identifying, based on the magnetic flux monitored at the position between the poles, points in time in which ~~said~~ the cord members exhibit magnetic flux leakage, wherein ~~said~~ the points in time are indicative of the location of rope degradation.

5) (Amended) A method for approximating tension-load bearing capacity of a rope comprising a body of non-ferromagnetic insulator material in which a plurality of longitudinally extended ferromagnetic cord members is distributed transversely, ~~said~~ the method comprising

applying a magnetic field to a portion of ~~said~~ the cord members by positioning a pair of magnetic poles adjacent to the body of the rope, wherein the poles are spaced longitudinally relative to the rope;

measuring, at a position between the poles along a longitudinal direction of the rope, magnetic flux emanating from the cord members out through the body of the rope and associated with ~~said~~ the magnetic field; and

comparing, based on the magnetic flux measured at the position between the poles, ~~said~~ measured magnetic flux leakage to predetermined data indicative of tension-load bearing capacity.

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6) ~~A~~(Amended) A method of detecting and locating degradation of a rope comprising a body of non-ferromagnetic insulator material in which a plurality of longitudinally extended ferromagnetic cord members is distributed transversely, ~~said~~the method comprising

applying a magnetic field to a portion of ~~said~~the cord members by positioning a pair of magnetic poles adjacent to the body of the rope, wherein the poles are spaced longitudinally relative to the rope;

monitoring, at a position between the poles along a longitudinal direction of the rope, magnetic flux emanating from the cord members out through the body of the rope and associated with ~~said~~the magnetic field;

identifying, based on the magnetic flux monitored at the position between the poles, locations along each individual cord member exhibiting magnetic flux leakage, wherein ~~said~~the locations are indicative of degradation; and

correlating ~~said~~the locations indicative of degradation of individual cord members with respect to each other to determine relative locations of each.

7) ~~A~~(Amended) The method according to claim 3, further comprising measuring the magnitude of ~~said~~the magnetic flux leakage.

8) ~~A~~(Amended) The method according to claim 4, further comprising measuring the magnitude of ~~said~~the magnetic flux leakage.

9) ~~A~~(Amended) The method according to claim 6, further comprising measuring the magnitude of ~~said~~the magnetic flux leakage.

10) ~~A~~(Amended) ~~An apparatus for detecting and locating degradation of a rope comprising a rope body of non-ferromagnetic insulator material encasing having at least one longitudinally extended ferromagnetic component, said~~the apparatus comprising

a detector body comprising rope guide means for guiding ~~said~~the rope along ~~said~~the detector body;

a magnet fixed with respect to ~~said~~the body- for establishing a magnetic field adjacent to ~~said~~the detector body, the magnet comprising a pair of magnetic poles located adjacent the rope body and spaced longitudinally relative to the rope when the rope is guided along the detector body by the rope guide means;

magnetic flux sensing means mounted with respect to ~~said~~the detector body at a position between the poles for monitoring magnetic flux emanating from the ferromagnetic component out through the rope body and associated with ~~said~~the magnetic field; and

means for correlating ~~said~~the magnetic flux with ~~said~~ rope ~~to determine one or more locations of degradation.~~

11) ~~A~~(Amended) ~~The apparatus according to claim 10, wherein~~

~~said~~the rope comprises a plurality of the ferromagnetic cord members.

12) ~~A~~(Amended) ~~The apparatus according to claim 11, wherein~~

~~said~~the magnetic flux sensing means comprises a plurality of magnetic flux sensors mounted to ~~said~~the body.

13) ~~A~~(Amended) ~~The apparatus according to claim 12, wherein~~

~~said~~the magnetic flux sensors comprise Hall effect transducers.

14) ~~A~~(Amended) ~~The apparatus according to claim 12, wherein~~

~~said~~the plurality of magnetic flux sensors each corresponds to one of ~~said~~the ferromagnetic cord members such that each magnetic flux sensor monitors the magnetic flux of a respective one of ~~said~~the cord members.

- 15) ~~A~~(Amended) ~~#~~The apparatus according to claim 14, further comprising control means for correlating the magnetic flux detected by each of ~~said~~the magnetic flux sensors.
- 16) ~~A~~(Amended) ~~#~~The apparatus according to claim 14, wherein ~~said~~the plurality of magnetic flux sensors are positioned with respect to ~~said~~the body so that they remain on one side of ~~said~~the rope when it is guided along ~~said~~the body.
- 17) ~~A~~(Amended) ~~#~~The apparatus according to claim 14, wherein ~~said~~the plurality of magnetic flux sensors ~~are~~is positioned with respect to ~~said~~the detector body so that ~~they~~the magnetic flux sensors are on opposing sides of ~~said~~the rope when it is guided along ~~said~~the detector body.
- 18) ~~A~~(Amended) ~~#~~The apparatus according to claim 10, further comprising means for mounting ~~said~~the apparatus in an elevator assembly in such a manner as to enable ~~#~~the rope guide means to engage and guide an installed elevator rope with said rope guide means for detecting and locating so that the apparatus can detect degradation of ~~said~~the elevator rope.
- 19) ~~A~~(Amended) ~~#~~The apparatus according to claim 10, further comprising means for mounting ~~said~~the apparatus to an elevator hoist machine assembly in an elevator assembly in such a manner as to enable the rope guide means# to engage and guide an installed elevator rope with said rope guide means for detecting and locating so that the apparatus can detect degradation of ~~said~~the elevator rope.

20) ~~A~~(Amended) ~~The~~ apparatus according to claim 10, wherein

~~said~~the apparatus is a self-contained, portable unit adapted to be transported to and from an elevator assembly for use therewith to enablethe rope guide means ~~it to engage and guide an installed elevator rope with said rope guide means for detecting and locating~~ so that the apparatus can detect degradation of ~~said~~the elevator rope.

32) (Amended) A monitoring system for monitoring ~~the level of excitation~~ approximate load-bearing capacity of an elevator rope having a longitudinally-extended load-bearing element that supports the tension loads of the elevator system and a jacket that encompasses the load-bearing element, said monitoring system comprising

excitation means for exciting said load-bearing element in a manner such that said jacket is not subject to excitation; ~~and~~

monitoring means for monitoring the level of excitation of said load-bearing element; and

correlating the level of excitation with the approximate load-bearing capacity of the elevator rope.

33) (New) The apparatus according to claim 10, wherein the means for correlating determines one or more locations of the rope degradation.